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Dear Cavalli,

Many thanks for your last letter. First of all I am enclosing a reprint of my letter to Nature, and also a typescript of another letter just submitted, dealing with the enhancing effect of UV on recombination. I thought this latter might interest you. I am quite sure of the results though not, of course, on the provisional theory based on them. When 58-161 log phase broth cultures are irradiated and then incubated in broth for an hour and washed, the resulting concentrated suspension is markedly viscid. I have had one such preparation estimated in an Ostwald viscometer before and after treatment with DNA-ase and the viscosity is definitely reduced. I shall be doing some more tomorrow. This viscosity does not seem to be produced after irradiation of W 677 nor of an infertile 58-161 strain obtained from Spicer. This will also be checked tomorrow, I hope. I am particularly interested in Spicers strain. His W 677 & 58-161 strains (? obtained from you) showed recombination just over a year ago. He left them on egg medium in the refrigerator for a year while he was doing the Dip. Bact. course and when he returned and tested them, they showed no recombination. Working on my provisional theory, I suggested to him that his 58-161 had lost its self-reproducing gamete and had therefore become like W 677. On testing them out I found that his W 677 strain showed recombination with my 58-161 but not vice versa. His 58-161 is completely infertile, even after UV stimulation. I am now anxious to show: (1) That Spicer's 58-161 is capable of prototroph formation when mated with a strain that behaves like my 58-161, e.g. 58-161 reverted to prototrophism, or a prototroph from the mating of 58-161 & W 677, or some other interfertile strain in accordance with your work; (2) That Spicer's strain can be made fertile again. This latter I propose to test for in the following way: Make 58-161 Spicer S^r, and also Azide^r as a marker, then allow it to grow in a fertile 58-161 culture after irradiation; finally to plate out on streptomycin-agar and pick a number of colonies which are S^r Az^r, and which presumably are not all prototrophs, and test these for ability to recombine with W 677. If these experiments work out (they probably won't!) I would consider the evidence very strongly in favour an "infective" gamete which, like symbiotic phage, can be lost from a culture but which has no lytic properties. If one assumes this to be the case it would explain your findings concerning the absence of interfertility in W 677 and its existence in the case of 58-161, wild-type K 12 and all prototrophs since, in cultures of these strains a proportion of cells would lose their gamete and become "gene acceptors" like W 677. However, I have now tested 140 colonies from one plating of 58-161 and have not yet found one colony which is not fertile.

In answer to your question, I have tried to see whether prototrophs would result if 58-161 and W 677 were both sterilized by streptomycin. The answer is "No". I would very much like to try strains other than TLB_1 -, however. I have not yet succeeded in obtaining a back mutation to prototrophism with my 58-161, even after irradiation. I would be grateful if you could send me this, one strain with and another without sugar deficiencies, both of which you say you have obtained. They would serve both my purposes. Would you like 58-161/Spicer? Incidentally, 58-161 is definitely Biotin +. I find that my strain grows just as well in basal medium + methionine, whether or not biotin is added, when glucose is replaced by pure hydrolysed saccharose which is, I think, certainly biotin-free. Moreover in a short paper by Davis (J. Bact., 1950-60-507) he refers to 58-161 as requiring only methionine.

Incidentally, do you know anything about a meeting of what I think is called the "International Association of Microbial Geneticists" which is meeting in Naples in either April or September? I would very much like to produce some of my results there (as well as to see Naples!) but don't know how to go about it. If you should have any information on this, I would be grateful to have it.

I think this letter is very diffuse but I thought I would like to tell you how things are going with me. I find this recombination a fascinating phenomenon.

Yours sincerely,

William Hayes